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PROBLEMS FOR SOLUTION.

ALGEBRA.

269. Proposed by O. E. GLENN, Ph. D., Springfield, Mo.

Express the hyperbolic functions of x in the form of infinite continued fractions.

270. Proposed by C. N. SCHMALL, College of the City of New York, New York City.

Two ferry-boats started simultaneously from opposite sides of a river and one being faster than the other, they met 720 yards from the shore. Each boat remained 10 minutes in its slip to change passengers and started on its return trip, when it was found that they met again 400 yards from the other shore. What is the width of the river?

CALCULUS.

221. Proposed by REV. R. D. CARMICHAEL, Hartselle, Ala.

Find $\operatorname{Lim}_{x \doteq 0} \tan^{-1}x(\log x)$.

222. Proposed by REV. R. D. CARMICHAEL, Hartselle, Ala.

If $s_n = 2\left(\frac{1}{n} - \frac{2}{2n^3} + \frac{1}{5n^5} + \frac{1}{7n^7} - \frac{2}{9n^9} + \frac{1}{11n^{11}} + \ldots\right)$ prove that

$$\log 3 = s_3 + s_4,$$
$$\log 7 = s_2 + s_3 + s_4,$$
$$\log 13 = s_2 + 2s_3 + s_4.$$

223. Proposed by O. E. GLENN, Ph. D., Springfield. Mo.

Prove that $\operatorname{Lim}_{n \doteq \infty} \frac{\sum_{\lambda=1}^{n} \lambda^k}{n^{k+1}} = \frac{1}{k+1}$.

224. Proposed by W. J. GREENSTREET, M. A., Editor of The Mathematical Gazette, Stroud, England.

Prove that $\int_0^\infty \tan^{-1}(\tan\alpha \sin x)\frac{dx}{x} = \frac{1}{2}\pi \log(\tan\alpha + \sec\alpha)$.

GEOMETRY.

295. Proposed by S. F. NORRIS, Professor of Mathematics, Baltimore City College, Md.

One side and the opposite angle of a triangle are fixed. Find the locus of the center of the inscribed circle. Solve by methods of analytic geometry.

296. Proposed by J. J. QUINN, Ph. D., Warren, Pa.

Given $AB = BC$ perpendicular to each other, and E and M their mid-points, respectively. On AB describe a semi-circle, and draw CE to meet the circumference in D. Draw DM cutting AB in F. In what ratio is AB divided by the point F?